

June 29, 1937.

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2,085,281

METAL BUILDING STRUCTURE AND METHOD OF ASSEMBLING THE SAME

Filed Aug. 1, 1933

4 Sheets-Sheet 1

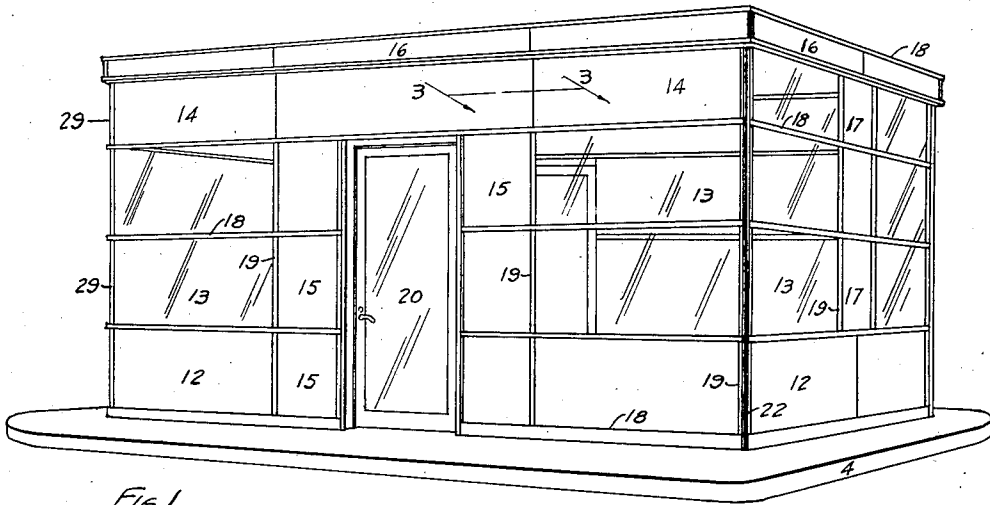


Fig. 1

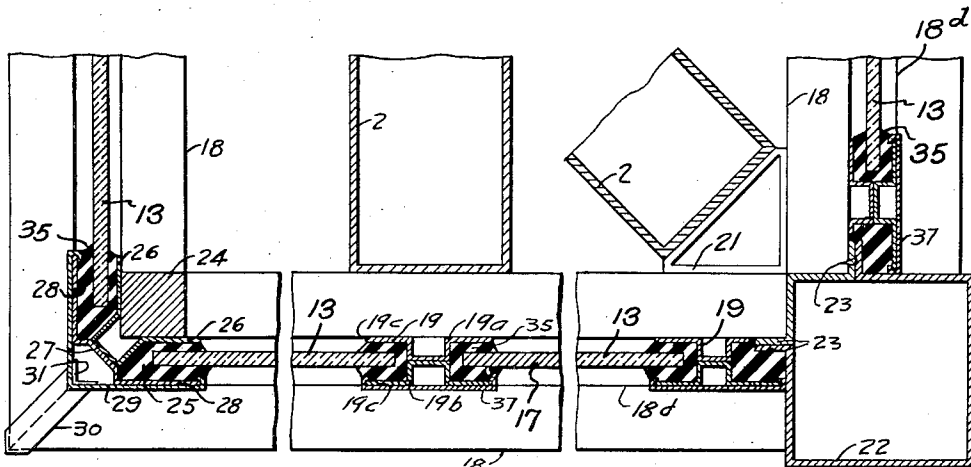


Fig. 2

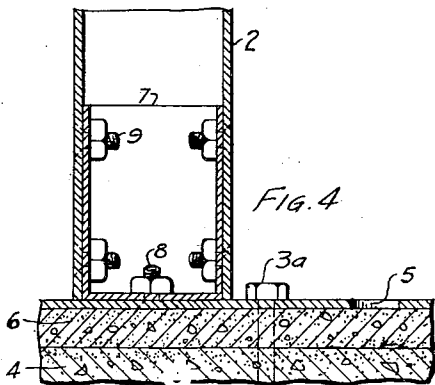


Fig. 4

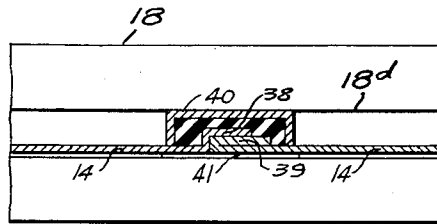


Fig. 3

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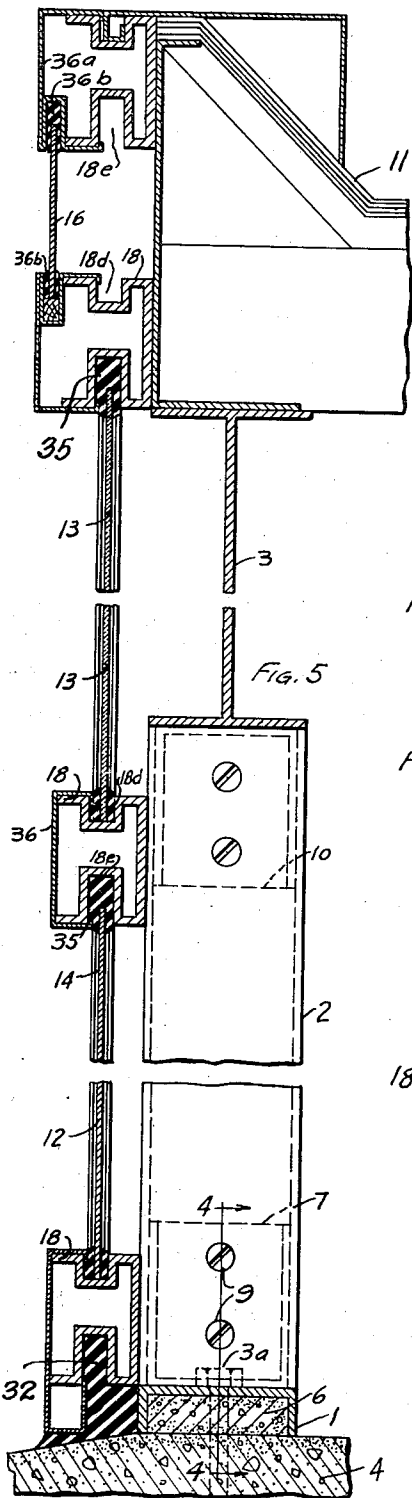
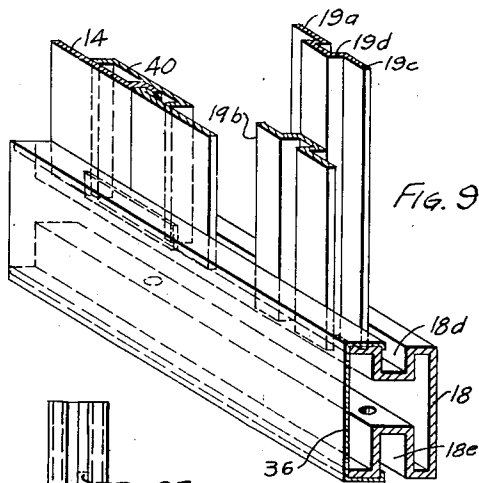
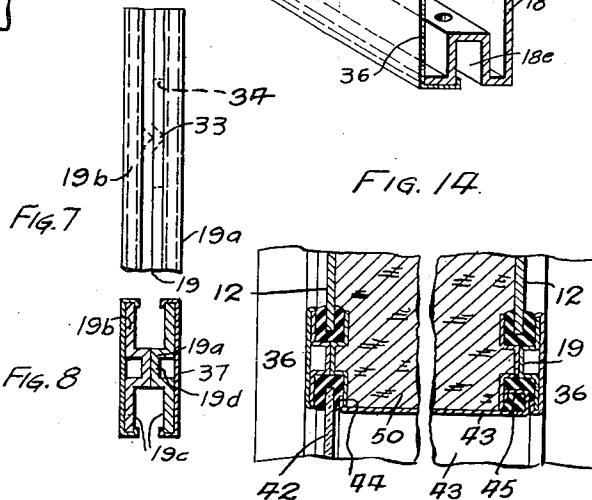
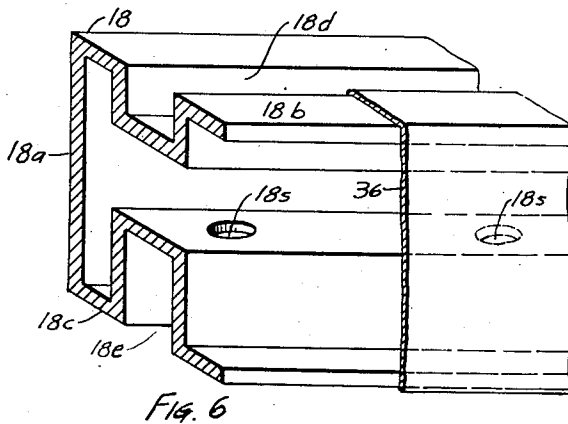
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4 Sheets-Sheet 2



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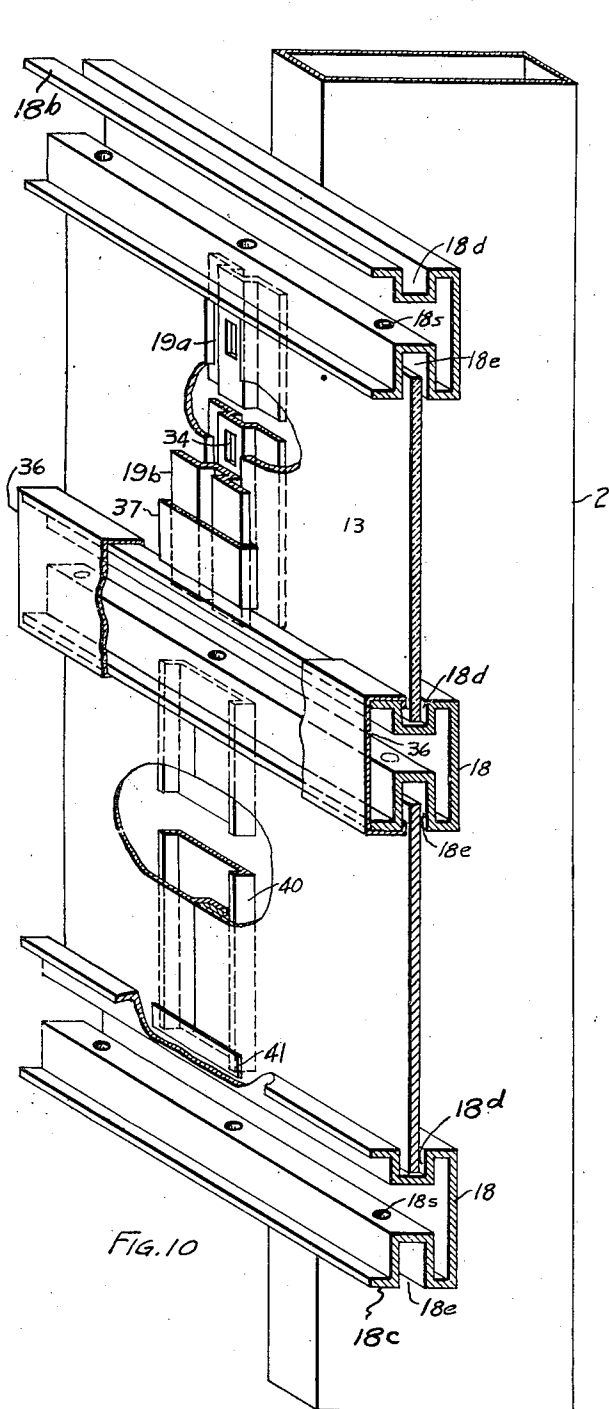
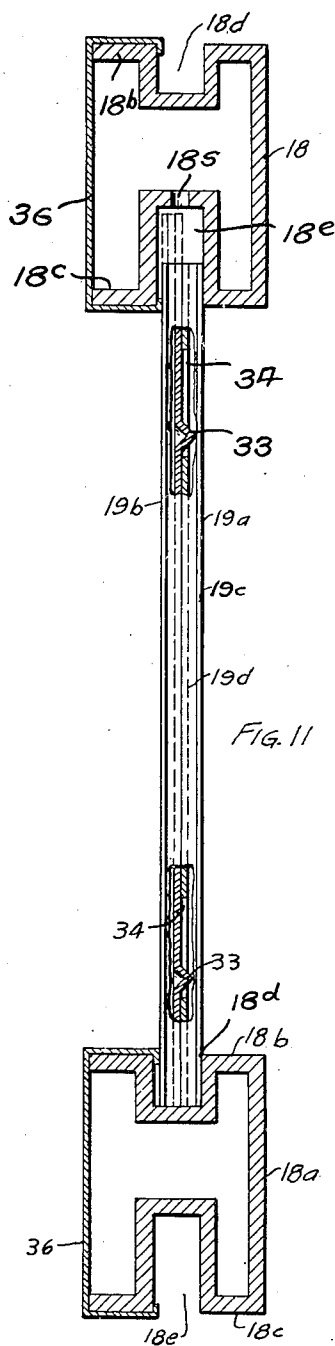
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2,085,281

METAL BUILDING STRUCTURE AND METHOD OF ASSEMBLING THE SAME

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4 Sheets-Sheet 3



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4 Sheets-Sheet 4

FIG. 12

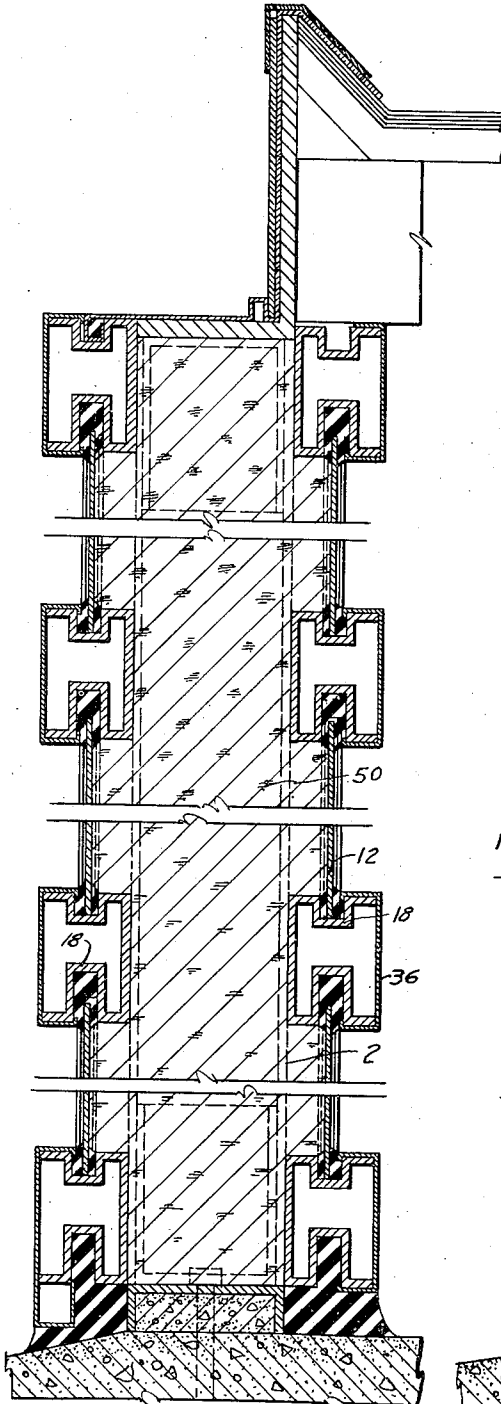
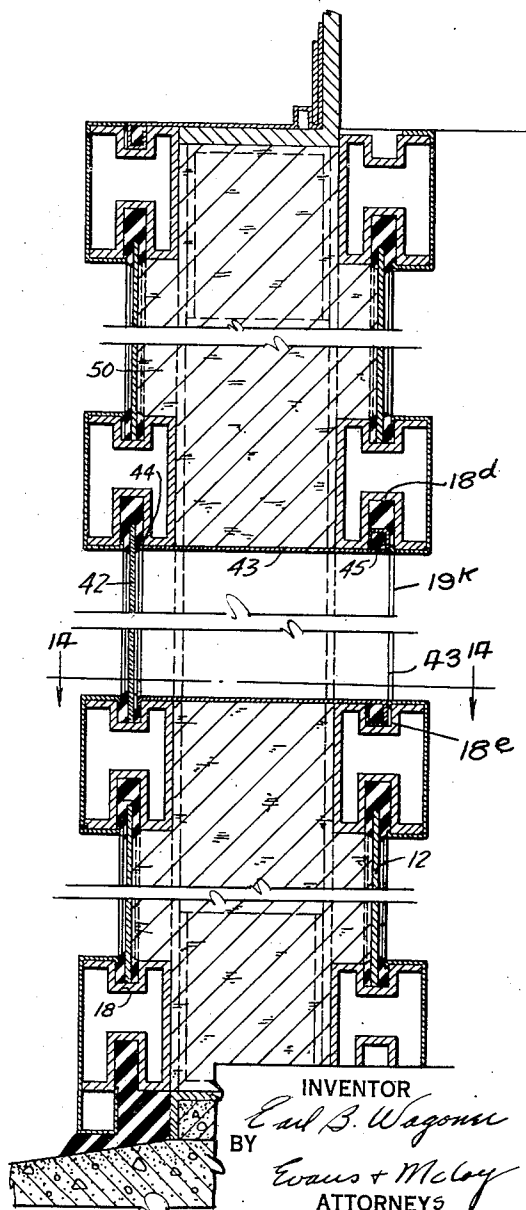


FIG. 13.



UNITED STATES PATENT OFFICE

2,085,281

METAL BUILDING STRUCTURE AND
METHOD OF ASSEMBLING THE SAMEEarl B. Wagoner, Lakewood, Ohio, assignor, by
mesne assignments, to R. H. Jamison

Application August 1, 1933, Serial No. 683,181

9 Claims. (Cl. 189—34)

This invention relates to building structures and more particularly to new and improved wall constructions therefor.

Owing to the depletion of timber and the corresponding high cost of construction work, together with the fire hazard inherent in such construction, there is a tendency toward other forms of building construction that will provide for rapid erection, artistic effects and a provision for salvaging of a large part of the original construction for use at different locations. This form of construction is now turning to various forms of metal construction for both inside and outside walls, and since the advent of a successful method of forming large panels of steel with vitrified enamel in permanent colors a wide variety of architectural and artistic effects can be obtained, and particularly in buildings used in the oil industry in dispensing oil and gasoline.

This form of construction is also applicable to other buildings of modern design used in many lines of trade which are desired to be built in an artistic manner and which may be salvaged in practically the original form for erection in other locations and also for the covering of old buildings of either brick, wood, stone or steel where it is desirable to provide a totally different architectural and artistic effect, using their original structural form as a base or framework for covering with the walls of the present invention.

One of the objects of the present invention is to provide a building wall structure which may be economically manufactured and easily assembled, and which is so constructed that it may be salvaged and re-erected or assembled at a different location without damage to the component parts of the construction.

Another object is to provide a building framework with an inside or outside wall structure or both in the form of a plurality of horizontally or vertically disposed panels which may be of metal, vitreous enameled steel or glass, or other suitable material, or combinations of such materials in order to provide for new architectural design and for artistic effects.

Another object is to provide a building framework with an inside or outside wall structure, or both, in the form of a plurality of horizontally or vertically disposed panels and with improved mounting means for such panels for attaching the same to steel framework, as well as to brick, wood or other old framework without alteration of such old framework.

Another object is to provide a building frame-

work with an inside or outside wall structure, or both, in the form of a plurality of horizontally or vertically disposed panels and with improved mounting means for such panels, together with means for sealing the structure against the elements, as well as to provide the necessary artistic relief between adjacent panels of the wall structure.

Another object is to provide a building framework with an inside or outside wall structure, or both, in the form of a plurality of horizontally or vertically disposed panels and with a semi-rigid mounting means that will compensate for vibration such as set up through operation of heavy vehicles on the streets or mild forms of earth tremors such as are common to certain parts of the country, without disturbing the general alignment of the various parts of the structure.

A further object is to provide in a wall structure employing panels of metal, glass or other suitable material, a construction that will have no protrusions such as bolts, screws or the like, visible to the eye for holding the parts together.

A still further object is to provide a wall construction in the form of panels of metal, vitreous enameled steel or glass without any apparent means of holding the wall in place or the parts thereof together, thus providing a wall surface that is sanitary and which may be washed or otherwise cleaned frequently.

With the above and other objects in view, which will be apparent from the following detailed description, the present invention consists in certain features of construction and combinations of parts that will be readily understood by those skilled in the art to which the invention appertains.

In the drawings, which illustrate suitable embodiments of the present invention:

Figure 1 is a perspective view of an assembled building structure incorporating the features of the present invention.

Fig. 2 is a transverse fragmentary section through one of the walls of the building structure showing the manner of mounting the panels which form the wall and also showing the two different corner constructions illustrated in Fig. 1;

Fig. 3 is a section taken approximately on the line 3—3 of Fig. 1, showing the connection between two adjoining panels of wall material;

Fig. 4 is a vertical section taken approximately on the line 4—4 of Fig. 5 showing the manner

of attaching the vertical members to the foundation;

Fig. 5 is a fragmentary vertical section taken through one of the walls of the building structure;

Fig. 6 is a fragmentary perspective view of one of the horizontal framing members for the panels that form the wall structure, the cover plate therefor being broken away and partially removed;

Fig. 7 is a fragmentary side elevation of the two members which form one of the intermediate vertical elements of the wall structure;

Fig. 8 is a transverse section taken through the elements illustrated in Fig. 7;

Fig. 9 is a fragmentary perspective view showing one of the horizontal framing elements supporting the vertical elements, the cover plate of the vertical element being removed, and also showing a fragmentary portion of the connection between adjacent panels;

Fig. 10 is a fragmentary perspective view showing the wall assembly in various stages of assembly;

Fig. 11 is a vertical section through the wall assembly, portions of the same being broken away to illustrate the connection between adjacent portions of the vertical wall elements;

Fig. 12 is a fragmentary vertical section showing the application of the present invention to a construction embodying inner and outer walls;

Fig. 13 is a section corresponding to Fig. 12 showing the provision in the double wall structure for a window opening; and

Fig. 14 is an enlarged section taken approximately on line 14-14 of Fig. 13.

Referring to the accompanying drawings in which like numerals refer to like parts throughout the several views, the wall structure as previously mentioned is so arranged that it may be carried by any suitable framework, whether it be of new or old construction or of wood, metal or brick. However, for the purpose of illustration, the wall structure is shown in the accompanying drawings as being carried by a metal framework, which comprises side and end bottom sills 1, a plurality of posts 2 extending upwardly from the bottom sills 1, and side and end upper horizontal beams 3 supported upon the vertical posts 2. The lower sills 1 are preferably of inverted channel shape having their flanges seating on the foundation 4 and being lagged thereto by means of suitable lag bolts or screws 3^a extending into the foundation 4. The webs of the sill channels are formed with spaced openings 5 thereof at regular intervals through which a suitable thin cement mixture or other material may be introduced into the space 6 between the channel webs and foundation to provide waterproof joints between the sills and foundation.

Upwardly projecting clamping brackets or boots 7 are secured by means of bolts 8 or by welding or other suitable means at regular intervals to the sills 1 and the vertical frame posts 2 are rigidly attached to these boots 7. As shown in the drawings, the vertical posts may be tubular in cross section to telescopically receive the boots 7, suitable bolts 9 or other securing means being employed to secure the posts 2 to the boots 7. The posts 2, however, may be of channeled, I-beam, or any other suitable cross-sectional shape.

The upper ends of the vertical posts 2 also carry attaching brackets or boots 10 to which the upper horizontal beams 3 of I-beam or other desirable shape are suitably attached. These

upper beams 3 form a support for the roof 11, which is shown here to be of flat or deck type. No attempt, however, will be made to describe the roof supporting girders and bracing members as these may be part of any general design of a building of this class and can be installed in the usual manner.

The wall structure of the present invention includes a number of panels of metal, vitreous enameled steel, or glass, or any suitable combination thereof, such as indicated in Fig. 1, wherein the walls are horizontally paneled, and wherein the lower panels 12 may be of vitreous enameled steel, the intermediate panels 13 may be of glass, the uppermost panels 14 at the front and the panels 15 surrounding the door opening may be of vitreous enameled steel. Also the narrow panels 16 surrounding the roof may be of vitreous enameled steel. These panels may be arranged in different combinations and those that are of vitreous enameled steel may be of the same or different colors to provide any desired artistic effect, such as by interposing panels 17 of metal or vitreous enameled steel intermediate the adjacent panels 13 of glass, as shown at the right end of the structure in Fig. 1.

The means for supporting the various panels referred to comprises a plurality of horizontal main framing members 18 and vertical secondary framing members 19 disposed in suitable locations depending upon the longitudinal extent of the wall panels. Each main framing member 18 is in the form of a rolled steel element having a back 18^a which is secured by any suitable means to the vertical posts 2, an open front, and top and bottom portions 18^b and 18^c, respectively, which are formed with longitudinally extending rectangular shaped panel receiving channels 18^d and 18^e, the channels 18^e being of greater depth than channels 18^d for a purpose to be later described.

These main framing members extend from end to end of the building structure except where they are interrupted by a door opening, such as the opening for the door 20 indicated in Fig. 1.

Different corner effects may be provided in the same structure as indicated in Figs. 1 and 2, the corner at the right being of heavy cross-section and the corner at the left being of narrow cross-section. In the case of the heavy corner section, indicated in Figs. 1 and 2, at the right the vertical post 2 is disposed at an angle and secured to it is a triangular shaped post 21 to which the ends of the horizontal framing member 18 are secured. A tubular corner trim post 22 of suitable design is disposed between the ends of the meeting framing members 18, as indicated in Fig. 2, this trim post having flange portions 23 which lie within and which may be secured to the inner side faces of the channels 18^d and 18^e.

In the case of the narrow corner shown at the left in Fig. 2, the vertical post 2 is omitted in order to provide the narrowed effect and narrow posts 24 are disposed to extend between the parallel main framing members 18, which posts 24 form reinforcing supports and abut against channel shaped members 25 having flaring flanges 26 which flanges 26 may be secured at their ends to the inner side faces of the channels 18^d and 18^e of the main framing members. Also secured to the channel members 25 are angular members 27 which are provided with flanges 28 spaced from the flanges 26 which may be secured to the outer sides of the channels 18^d and 18^e. In order to close in this latter member 27 and provide a neat

appearing corner trim, cover plates 29 are provided which have flange portions arranged to snap over the edges of the flanges 28 as indicated in Fig. 2, and in order to close the bevel joint between the meeting main framing members 18 at this corner of the structure, a trim plate 30 is provided which has an inner flange 31 that fits within the cover plate 29, or which flange 31 if desired may fit within the ends of the channels 18^d and 18^e.

At each side and end of the building structure a main framing member 18 is provided at the lower ends of the posts 2 adjacent the inverted supporting sill 1, and in order to form an additional waterproof seal the space within the channel 18^e thereof and between the main framing member and foundation is filled in with a suitable mastic material 32. Prior to this, however, a cover plate 36 to be later described, is attached to the framing member 18.

Additional main framing members 18 are provided at the upper end of the structure around the roof portion thereof and two such members may be provided at this location to form an additional trimming feature. Also any desired number of intermediate framing members 18 may be provided to give the desired artistic effect and architectural rigidity.

The secondary vertical framing members are preferably formed in two parts 19^a and 19^b, one of which has a horizontal tongue or rib 33 disposed to fit within an elongated slot 34 in the other part, as indicated in Fig. 11, to prevent transverse shifting of these parts, and to permit longitudinal sliding of one part relative to the other during assembly. Each of these parts has oppositely disposed marginal flanges 19^c and an offset intermediate flange 19^d which abuts the corresponding flange of the other substantially at the center line of the wall panel when assembled, so that the spaced flanges 19^c of the two parts provide a vertical panel receiving channel, the rib 33 and slot 34 being disposed in the flanges 19^d of the two parts.

After the main framing members 18 are in position and before assembly of the wall panels thereto, the inner part 19^a is placed in approximate position within the channels 18^d and 18^e, by inserting the upper end in the channel 18^e of the upper framing member 18 and moving the lower end over the channel 18^d of the lower framing member 18 and dropping the same within the channel 18^d to seat against the bottom thereof with the flanges 19^c seating against the sides of the panel receiving channels 18^d and 18^e.

The part 19^a is moved within the channels 18^d and 18^e to its approximate location and the angle provided by the offset flanges 19^c and 19^d is filled with a suitable mastic or sealing material 35 such as putty. Also the channels 18^d and 18^e are filled or practically filled with the sealing material.

After part 19^a of the secondary framing member 19 is positioned at its approximate location at each end of the panel, a panel such as 12 or 13 is assembled, which is of less width than the distance between the bottoms of the channels 18^d and 18^e which face each other. As the main framing members 18 are disposed with the deeper rectangular channel 18^e facing downwardly, the panel used to close the space between adjacent framing members is, owing to its being of less distance between the bottoms of the panel receiving channels, lifted upwardly until its upper edge reaches the top of the rectangular channel, then moved

inwardly until it is substantially vertical and then lowered into the rectangular channel 18^d in the top portion of the next lower main framing member so that it rests upon the bottom of channel 18^d.

The panel is then properly centered in the mastic material within the channels 18^d and 18^e and subsequently the part 19^b is assembled in the same manner as the part 19^a and wall panel, into abutting relation with the part 19^a and with the side flanges 19^c thereof butting the outer sides of the panel receiving channels 18^d and 18^e.

As the secondary framing member 19 comprising the two parts 19^a and 19^b is installed with a slide fit as between adjacent horizontal framing members 18, it is capable of being moved horizontally at will without losing its effectiveness as a retaining member, in order to provide for its proper location with respect to the end of the wall panel. After the panels and secondary framing members are in position a suitable mastic material 35 may be inserted through openings 18 "s" in the bottom of the channels 18^e to surround the upper ends of the panel sheet within the channel 18^e.

Channel shaped cover plates 36 having flanged edges are next snapped over the edges of the channels 18^d and 18^e of each main framing member 18, as indicated in Figs. 5 and 6, to close in the open side of the same, and correspondingly shaped cover plates 37 are snapped over the edges of the parts 19^a and/or 19^b of the secondary framing members to close in the space between the flanges 19^c to provide a neat appearance, these latter cover plates 37 extending between the horizontal portions of the cover plates 36 of adjacent main framing members. After this is accomplished, additional mastic material 35 is inserted within the space between the wall panel and flanges 19^c of the parts 19^b, and other mastic material may be inserted within the channels 18^d and 18^e and smoothed off to provide the proper seal between the panel and horizontal and vertical framing members. This mastic material is of waterproof type, such as putty or other material of this nature.

Additional sealing mastic is provided within the endmost panel receiving channels which are disposed adjacent the corner trim posts 22 in order to further seal the structure.

In the case of the flat roof employing a deck construction, as illustrated in the drawings, the side of the building is continued above the deck to a predetermined height and finished with a coping, utilizing the last or top framing member 18 with a cap 36^a so designed that its forward edge will engage in the manner previously described in the rectangular channel 18^e and extending upwardly and over the member, thence downwardly where it may be suitably attached to a portion of the roof construction. This cap and the cap for the next lowermost main framing member 18 are shaped, as indicated in Fig. 5, to provide longitudinal channels 36^b, in the same manner as the channels 18^d and 18^e, so that narrow trim panels 16 may be interposed therein to carry out the artistic effect.

In the case of the panels 16 and the panels 12 and 14 of metal or vitreous enameled steel, it may be desired to provide a continuous effect without the interposition of the vertical secondary framing member previously described. In this case the end of one panel 14 is preferably offset as indicated in Fig. 3, to provide a flange 38, which offset flange abuts against a reversely bent end

39 of the next adjacent panel, and in order to hold these abutting ends 38 and 39 together and form a sealed joint a vertical channel 40 is disposed at one side of the wall panels within the opposed channels 18^d and 18^e of adjacent framing members, with the flanges thereof abutting the panels 14 and a suitable wedge 41 is supplied at the other side of these panels, which is of lesser depth than the channels 18^d and 18^e, and which is driven into the channels 18^d and 18^e to hold the panels against the flanges of the channel member. Prior to assembly, the channel member 40 is filled with a sealing mastic such as putty to provide a suitable waterproof seal. The channels 18^d and 18^e are also filled with the mastic prior to assembly of the channel member 40 and wedge 41.

In the construction illustrated in Figs. 12 and 13, which shows a double wall, the same procedure is followed in assembling the different parts of the wall. In this case, however, the main framing members are secured to opposite sides of the vertical posts 2. This structure illustrated in Fig. 12 provides a means whereby the space between the inner and outer wall panels may be filled with a suitable insulation material 50, of any suitable type.

In the case illustrated in Fig. 13, provision is made therein for providing a stationary or non-opening window 42 in which case the window opening space is provided by closing off the space between the adjacent framing members at opposite sides by means of closure plates 43 which are flanged to extend into the panel receiving channels 18^d and 18^e, and also into the panel receiving channels of the vertical framing members 19 which are provided at and form the sides of the window frame. In the event that glass is used in the outside wall only, this plate 43 has one edge 44 bent at right angles to extend into the channels 18^d and 18^e of the outer wall portion, and the other edge is formed with a bent portion 45 entering the rectangular channels of the framing members at the inner wall portion, thus forming a finished window opening.

Where it is contemplated to resurface an outside or an inside wall of an existing building of any construction, the same procedure may be carried out with the exception that the sills probably would be omitted, and that suitable provision may be made for securing the horizontal main framing members to the existing frame or wall of the building.

In the construction of the main framing members and the covers therefor, it is possible to employ relatively long panels of metal or glass or vitreous enameled steel in either a horizontal or vertical manner for the provision of either outside or inside walls, or both, or to substitute for any one particular type of panel any other type of panel to provide for any desired artistic effect.

The construction of the main framing members lends itself to a rapid and economical manufacture and as it is a single unit in itself it requires no pre-fabrication but may be cut to length and assembled at the point of construction by ordinary workmen to correspond to sizes of panels of metal or glass that may have been previously chosen for either architectural or artistic reasons.

In the form of construction described, it is possible to build an outer or inner wall covering without any apparent means of holding the entire wall covering in place since because of the particular construction, all means of assembly is concealed. This feature is especially desirable

in the provision of rooms where it is desirable to have a surface that is sanitary and that may be washed or otherwise cleaned frequently.

Although several embodiments of the invention have been herein shown and described it will be understood that numerous details of the construction shown may be altered or omitted without departing from the spirit of this invention as defined in the following claims.

What I claim is:

1. In a building wall structure, a pair of fixed horizontally extending parallel framing members having longitudinal panel receiving channels facing each other and lying substantially in the same plane, a pair of panels abutting each other at their ends and having their longitudinal edges removably disposed in said channels, a removable sealing member abutting said panels at one side at their plane of abutment and having its ends disposed in said panel receiving channels, and a wedge member disposed in at least one of said channels and abutting said panels at the other side.

2. In a building wall structure, a pair of fixed horizontally extending parallel framing members having longitudinal panel receiving channels facing each other and lying substantially in the same plane, a pair of wall panels having their longitudinal edges removably disposed in said channels and having their ends abutting each other, a vertical channel member having its ends removably disposed in said channels and its flanges abutting said panels at one side thereof, and a wedge member abutting said panels at the other side thereof and being wedged into one of said channels.

3. In a building wall structure, a pair of fixed horizontally extending parallel framing members having longitudinal panel receiving channels facing each other and lying substantially in the same plane, a pair of wall panels having their longitudinal edges disposed in said channels and having their ends abutting each other, a vertical channel member having its ends disposed in said channels and its flanges abutting said panels at one side thereof, and a wedge member abutting said panels at the other side thereof and being wedged into one of said channels, the space between said panels and channel member being filled with a plastic sealing material to form a waterproof joint at the region of abutment of said ends of said panels.

4. In a building wall structure, a pair of fixed horizontally extending parallel framing members having longitudinal panel receiving channels facing each other and lying substantially in the same plane, and a vertically extending secondary framing member adapted to be disposed in said channels and being of lesser length than the distance between the bottoms of said channels, said secondary framing member comprising a pair of metal elements abutting each other and each having a flange spaced from a corresponding flange of the other and each end of each of said elements abutting a side of said channels to provide a channel continuous with said first mentioned channels and to secure said vertical framing member in panel holding position.

5. In a building wall structure, a pair of fixed horizontally extending parallel framing members having longitudinal panel receiving channels facing each other and lying substantially in the same plane, and a vertically extending secondary framing member adapted to be disposed in said channels and being of lesser length than the

distance between the bottoms of said channels, said secondary framing member comprising a pair of metal elements abutting each other and each having a flange spaced from a corresponding flange of the other and each end of each of said elements abutting a side of said channels to provide a channel continuous with said first mentioned channels and to secure said vertical framing member in panel holding position, said metal elements having interengaging tongue and slot portions to permit longitudinal shifting and prevent transverse shifting thereof.

6. In a building wall structure, rigidly mounted spaced horizontal framing members, each having a longitudinal panel receiving channel in the plane of and facing the other, a vertical trim post abutting the ends of said members and having portions abutting the sides of said channels, vertical secondary framing members extending between said horizontal members adjacent said trim post, said secondary framing members also having panel receiving channels and having their ends disposed in said first mentioned channels, wall panels having their longitudinal edges disposed in said channels of said horizontal framing members and having their end edges adjacent said trim post disposed in said channels of said secondary framing members, and a plastic sealing material disposed in said channels and surrounding said edges of said panels.

7. In a building wall structure, a plurality of horizontally extending spaced framing members, each having a panel receiving channel facing the other, said members being securely mounted

independently of each other, a vertical corner element extending between each pair of members at certain of their adjacent ends, and a pair of vertical elements at said ends and adjacent said corner element and extending between each pair of members, said elements having their ends disposed in said channels and having spaced longitudinal flanges providing a panel receiving channel continuous with said first mentioned channels.

8. In a building wall structure, a pair of fixed, spaced framing members, each being of generally channel shape to provide spaced flanges, a cover plate for each of said members bridging said flanges, said cover plates having depressions therein facing each other, one or more panels having their edges disposed in said depressions, and a plastic sealing material disposed in said depressions to surround said disposed edges.

9. In a building wall structure a pair of fixed horizontally extending parallel framing members having longitudinal panel receiving channels facing each other and lying in substantially the same plane, a vertically extending secondary framing member arranged to secured a vertical edge of a panel having top and bottom edges positioned in the channels, said secondary framing member being of lesser length than the distance between the bottoms of the channels whereby it may be removed from the channels and longitudinally adjustable with respect to the horizontal framing members to accommodate panels of different size.

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